

Robin Vannote Interview

VR: Robin, thank you very much for coming out. You get the award for the longest distance traveled. Tell us a little about your early life. I know your father was an entomologist. What made you become a river ecologist?

RV: I guess my interest in streams and rivers began at a very early age, like all kids who walk in puddles. And I always had streams nearby, so I always walked in streams. As a kid I spent a lot of time collecting things in streams and bringing them home and I think I was always fond of wandering around, many times alone, just walking through streams, just wading down and picking off the leeches, sort of thing. So I always felt comfortable in streams, but I guess my first real formal look at streams, intellectually, was in high school I came across a couple of books. One by ?Needham? from Cornell that wrote Life of Inland Waters, so I studied that book in high school and I really liked that. And then there was a trout restoration book by a fellow from New York State and I thought that was really neat. So I think in high school I was already focused on streams as something I was really interested in. Some of my high school summer jobs were working for an entomologist on the experiment station at Rutgers, measuring the emergence of ?mandesonian decaigence? in freshwater swamps. I was just wading around swamps. So I think probably these early exposures to water, whether it was ponds, swamps, springs, or beaver ?flowages?, they were always sort of interesting.

VR [3:59]: Did you study biology in college?

RV: Yeah. I went to the University of Maine in Wildlife Conservation and I quickly aligned with the Fisheries department and the Zoology department at that time. ?Harry Eberhard? was the Fish Manager professor ichthyologist and wrote the textbook at the time on Fisheries Management. So he sort of took an interest in me because I was interested in streams. He was a Cornell man and my dad was Cornell. So, he sort of looked after me. And I think that making a connection in school is so important. So I had summer jobs when I was in college working for the Atlantic Salmon Commission. I was a field biologist. I think we got \$40 a week or something like that. Trying to figure out how to bring salmon migration runs back to Maine streams and rivers was a real challenging job that this fisheries biologist had ?on the Sea-run Atlantic Salmon Commission. I thought, "Well, this is what I want to do. I just want to be a fisheries biologist and work with Atlantic Salmon." You get a couple of summers of work at that you can see the paper and pulp waste, the dams, it was just a challenge that wouldn't be a productive career. It was just, Maine was impacted by stream pollution. And then I got encouragement from Harry Eberhard to go to graduate school. He listed of a number of good ones. Fortunately, I picked working under Bob Boln (VR: Bob Ball likely) at Michigan State because he was doing some real interesting stream work at the time. It was either going to Cornell, Michigan, University of Michigan, Michigan State, or Oregon. I think the assistantship under Bob Boln...was the most attractive. I was supposed to be a TA at some other place. It was a marvelous choice. I think I spent quite a few years getting a PhD, but I think the time was well spent because I really took advantage of every course that was available that I was interested in: physiology,

chemistry, soils, just a wide array. I really think that is an enrichment. I think too many people are too anxious to get done and out and don't really take advantage of what's available at university courses. I think that added enrichment is really good. I think the working with Bob Boln, he was sort of a pioneer in looking at nutrient spiraling by his experiments on the ?pigeon ruber? I think P32 looking at it's updates in periphyton and recycling, so that was sort of the first spiraling study conducted. That had some really interesting humorous side stories...spilled in the woods.

VR [8:40]: Your professional career I know took you to ?TBA? and then directly to Stroud from there?

RV: Right, I spent three years as supervisor of the biology section and I think that exposure was of tremendous value, too. Seeing really how big river systems work, how ?impounded? rivers work. And I was in an engineering department, essentially, it was held in public safety, but it was all run by engineers. They taught me early on that you couldn't understand how a system worked unless you understood how the physics of the system. You had to understand how water flowed, how it separated, turbulence, you had to understand the physics of a system and its operations if you wanted to know something about the biology, circulation patterns and reservoirs, and released water. So it's very instructional.

VR [10:01]: How did you come to go to Stroud?

RV: I was doing a big study on the Green River in Kentucky with TBA, they had just put in a very large esteemed power plant. There was a gross error on calculating the amount of water flowing in the Green River because the locks'd been raised and so the engineers thought there was much more water flowing in the river than there was. Just shifted the curve relating ?steps of flow? and to make a ?congregational? river and so it was a vastly oversized plant for the Green River. I think when they first turned both units on the river went up to 112 degrees and never saw so many dead fish in your life. It was just a very interesting experience and then they brought down the academy teens to study the river.

VR [11:20]: ?Stan Roebach?...

RV: Yeah, the whole group came down and I met Ruth and whatnot, but I think Ruth had contacted Bob Boln among others who might've been interested in the Stroud job.

VR [11:46]: You were the founding director, weren't you?

RV: Yeah, and so I moved up there in the summer of 1966 I guess, not knowing what kind of budget I'd have or what was really going to transpire but I knew that we'd developed some kind of research laboratory. So I essentially spent the first six months designing the lab, trying to find a place to ?site? it. Looked at a number of different streams, found one that was most suitable and then the Stroud family bought the farm that the site was on and became contiguous with some of their existing property. So there was a number of different, I guess there was three different streams I was looking at.

And then we started designing what size building, what was going to be in it. I was very modest and didn't design a very large facility and Mrs. Stroud said, "Don't you need something bigger than that?" I was sort of designing it after a small research lab that the ?Haas? family had built for the biology department at the academy on one of their properties. So, I think Joan Stroud had a lot of inspiration towards doing something for a significant rather than just having a station with a few people. So, I think given the opportunity to find something very substantial and long-lasting. The idea was not to build a 40-year building, let's build a 100-year building. Let's make it aesthetically pleasing. So it really became a family project in a true sense.

VR [14:23]: When you started at Stroud or maybe before, when did you start getting the first ideas about the Continuum, I remember you said a little earlier about your studies on White Clay Creek.

RV: Well, I think when I first got there and ?Paul? was 66, that's why I first started putting together leaf packs and putting them in streams. I sort of got that idea when I was working with TBA and ?collecting? in smaller streams and I had sort of a side project then. I did on the way home from major field work and I got very intrigued with the amount of leaves in Kentucky streams. The insect community in those, but I'd never had an opportunity to explore this any further, being a government employee. So, that's the first thing I wanted to do. So I ran that by ?Edwin Hutchinson? what he thought about this as being a viable project and he thought it was very interesting and he encouraged me, so I started out sewing leaf packs together and trying to estimate how my leaves were flowing in streams. I put in some ?naive weers? ?electric? and found that storms were very ?perilble?. Even small ones. So I think looking at the Detritus leaf little essentially, that's all I was working with at the time, from headwaters down to the third order stream, sort of got me looking at more than just a station by station analysis of something.

VR [16:25]: The ?geomorphology? you brought into the Continuum, was that self-taught or did you have that back at Michigan State?

RV: Well, during my studies on the Red Clay Creek" in ?Red Cedar? River in Michigan, the last year of that work was the first time that bulldozers started tearing up the landscape for the interstate highway to Michigan. And the Red cedar had eleven tributaries coming in from the south and two from the north, so they put the highway on the south side and every one of those streams became a ?conduit? after every rain storm. It was just a terrific impact on sediment accumulation, and here I was trying to look at a small mouthed bass nesting. It was like a disaster. But I think I started measuring depths of sandbars in the streams there. But I think it's part of just understanding the physical geometry of channels. And I would guess it's ?Reds Lowman? and ?Luna Leopold's? discussions with...and they would come out. They were available. So, our guess with the TBA work, I was just ?engrained? to think that, understand the channel. Doing any study on ?channelization? for the ?Counsel of Environmental Equality? just exposed me to a lot of what tremendous amount of dynamics goes on in a channel after it's been gutted as it tries to weakly restructure itself with sediment, but it really can't because it's confined in it's narrow channels, so it's just always shifting. You can see the dynamics of seasonal

changes in water on the shifting of these sediments and there's just no stability because there's no vegetative shield and you can't have stability if you don't have that vegetative shield. The Pennsylvania Piedmont streams, the uplands are largely in agriculture and the hill slopes in the wetlands are in woods. And it's essentially a 20:80 percent ratio and it's been that way since the early 1700s, because William Penn and ?Steve Olovgenes? required that every farm had to keep one to five acres of woods. Because he recognized the problem they had in Europe. No, and that's the way it remained in Piedmont, Maryland, Pennsylvania, there's still that ratio. But the problem is the run-off from the uplands is always diverted to woods. And woods erode terrifically when water's diverted through them. So that was one of the challenges of studying in those Piedmont streams was how do you route water into streams when it's always going to run off agricultural fields in the wintertime?

VR [20:31]: This wasn't part of that ?CEQ? grant, was it?

RV: No. But I think these were all the things that you see and when you're out on these studies of What happens when vegetative shields are disturbed? and What happens when there's no vegetative control within a stream channel or even removed the large boulders and obstructions in the channel because you're only interested in maximizing the delivery of water.

VR [21:05]: Now then, you'd said that CEQ grant and I just want to ask you another question: That brought you all around the United States looking at streams. That was...

RV: It didn't go to every state, but it went to 42 streams that were distributed pretty widely. And the work actually involved studying the documents leading up to the work. Why was the work done? And then going out, meeting with the project sponsors, the ?SCS? people from the state and the county and perhaps someone from Washington, depending on the project, and then I went back and did a kind of a biology study of What was in the channel? and What was in a similar channel nearby that wasn't disturbed? And this was an eye-opener. This was important in knowing how streams are similar across a lot of different geographic areas. And we're all trained that channels are constructed to convey water and sediment. That's their purpose. That's why they're there. And then the biology has to fit into these mechanical and chemical parameters described in the channel. So that's why I had to really understand the physical dynamics of the system as well as the biology. I always encourage students to pay good attention to both.

VR [23:08]: What I wanted to ask you was, the different people that were on the Continuum with you in terms of what roles do you think they played? For example: Bert Cushing. What was the big contribution that you think he made to the Continuum?

RV: Well, he was always interested in primary production aspects and the creek project I guess that was, that and the insects sort of the major things he was working with. I think he felt very comfortable in taking over with ?Tom Bodd? in looking at the developing methods for measuring it's primary production. I think Tom really took the lead in it

because he had been doing extensive work up and down White Clay Creek system. Tom was a very invaluable person in this group too.

VR [24:14]: What about Ken?

RV: Ken had all the energy and ideas and he's a worker. He's a valuable component, whereas Jim was the spirit, of course. And enthusiasm and "Get along with" and "Let's get moving". Jim got people working and Ken had a lot of knowledge to bring to the project.

VR [24:49]: How about Wayne?

RV: Wayne's a work dog. He's working like a student. They work work work for Wayne. I think Wayne's probably the major driver of the project. He has the self-discipline to really keep focused and demand stuff out of himself and he only gets distracted by his farm work.

VR [25:26]: In our talk this morning, you'd mentioned about that AAAS symposium. Would you say that's really where the group started? With that?

RV: Well, I think that's where the group got introduced to one another and found out what was going on, what other people were doing, what were some good ideas, what could I take home from this and try. I think, for me, it was meeting some people that I hadn't met before. And a chance to tell what I had been doing, what I've started. It was a good trip. Too bad they didn't put the right spelling on the front cover! Bob Boln I apologize for that. I forget what I misspelled, but I remember spelling.

VR [26:27]: Do you think that the rest of the scientific community was aware of what roles each of you played in the RCC? That Wayne was the work horse and Jim was the one that kept, or do you think you were viewed as one big group that just, everybody did everything?

RV: I don't know. I just didn't let it bother me. I had a lot of things going on, a lot of management things to do, a lot of personnel things to do, a lot of "cheat sheet" things to do.

VR [27:04]: When you were doing this, this was not the main thing you were doing, the River Continuum, was it?

RV: I just had a lot of things going. We were continuing our White Clay Creek studies.

VR [27:19]: And your lab was expanding tremendously, wasn't it?

RV: Yeah, after the Rockefeller study was completed...

VR [27:28]: The Rockefeller study was a...

RV: That was a three-year study for our ideas on what we want to do on White Clay Creek as a team project involving three or four scientists working on trying to understand the function and structure of a third order stream system. It didn't make it through ?IVP? review, but the Rockefeller Foundation liked it and they were thrilled with the results at the end and then they sponsored this workshop. And they also said they were so fond of our work, are proud of it, that they wanted us to be able to RR physical facilities ?slash?. So they called up the ?Crusty? Foundation and said they have a candidate and a couple of days out on a plane to the Crusty Foundation in Michigan and they gave us money to double the size of the lab and build a meeting house. The Crusty Foundation is just a brick and mortar. It's the foundations they rely on. Other research places like the Rockefeller Foundation tell them where to put the money.

VR [29:10]: Who in the Rockefeller Foundation were you dealing with? Was there an environmental group then?

RV: Yeah, his name was ?Richardson?. Ralph Richardson. I'm not sure other projects that he worked on.

VR [29:25]: Because in terms of environmental...

RV: Yeah, he was in a lot of agricultural work and he had a great fondness for Penn State University for some reason. Actually retired on a golf course around Penn State. But his son came to work for us and eventually got a PhD in marine biology. So that was interesting.

VR [29:53]: Now, Robin, were there any directions you would've like to have seen the RCC go into, any research areas, that either because funding stopped or people went on to other things that you didn't actually get to do?

RV: It's hard to kind of think back of what direction one would like to take it to. Because my time was really taken up by a lot of work with the studies of this geographical work on insect distributions and thermal equilibrium things which also fell out from the Rockefeller Foundation-sponsored studies.

VR [30:44]: Just what led to the third...

RV: Yeah, because we were doing so much work on metabolic rates on insects and growth rates and distribution within the drainage system. How temperature seemed to determine where species were. I would've been very interested in continuing the River Continuum Concept looking at stressed river systems to see how the efficiencies of systems might have changed with dropping out of species or groups of species and I think that would have a lot of potential in that area.

VR [31:33]: Especially when you think of all the biodiversity...biodiversity productivity.

RV: Yeah and structuring of populations and the evolution of the community structure I think are some interesting questions. And the base of the changes of water quality.

VR [31:55]: Have you been pleased with the way the River Continuum Concept has been used in management?

RV: I think you have to be pleased that an idea as continuum. An idea's the most cherished thing that someone comes up with. It's so valuable an idea. You really have to cherish ideas. And good ideas are more ?equitable?. You've got to look at every idea and the value and weigh it. You can't be too quick to dismiss ideas. They don't come easily. I would guess good ideas come more quickly to people that have a broader background in their education and more experiences. And then I think testing the ideas out with other people. Seeing whether we ?get funny looks? or help in fleshing out those ideas to something more rigorous and bigger question.

VR [33:32]: One of the things I think happens whenever something is successful, like the River Continuum Concept, is people take it and modify it slightly and put a new name on it. Serial Discontinuity is one that comes to mind. Do you think that was, did it bother you, was that okay to you that people were...

RV: Sure, I mean, who knows, maybe somebody will search back and find the River Continuum as it was described somewhere else with a different name. I don't know. People, I think, always want to find a different adjective or noun to add to something to make it fit their needs a little better. Ideas evolve, what's a good idea in one decade a decade later is built upon and made better. So, ideas like that become community property pretty fast. And should evolve to be more rigorous or be applied in a broader manner. So that's healthy and good.

VR [34:50]: One of the like, almost the logo, of the River Continuum Concept is the diagram with the stream with the functional feeding groups changing over time. Were you surprised that that's become such an identifiable, that graphic's become so identifiable with the concept?

RV: I think that even the design evolved, logo's evolved. I think looking at the ratio, the stream geometry, the ratio of lengths of widths and depths and these sorts of things are something that just took terrific numbers of measurements, with and without vegetative control, with or without a canopy. How these shift so rapidly where you can have a first order stream that's narrow in the woods and you put it out or wide in the woods and you put it out in the meadow and it's narrow and how grass ?encroaches? on streams. Just the dynamic changes I think just naturally lead you to just a simple design and you can hang the Christmas tree ornaments wherever you want, but it's just the idea: this is the ratio for streams to increase as they gain more water and energy.

VR [36:20] It's just that shape...

RV: Yeah, it's not necessary to throw a tributary here or an insect here or a fish here. It's really how water shapes a channel and then the biology gets in to the dynamics of the system and energy input.

VR [36:49]: Do you remember where the term "functional feeding groups" first came from?

RV: I think Ken must've come up with "functional groups". I think we had a discussion of how, when we were trying to figure out what we were going to sample on the ?bampost? the invertebrate communities. The ?standard? sampling size is either a ?hess? or a square foot sampler. And then randomizing these samples in ripples or pools or some technique. We had to come up with some ideas. I guess on the, I had been using the, more or less, the square foot or the hess sampler on a lot of the earlier studies. But when I got into studying the insect communities that were temporally and spatially sequenced, I found it more useful to use some terminology I came up with: Distinct Topographical Units. So I had communities that grazed algae off the top of rocks. So that was my pet thing or they worked in lead packs or they were on sand or silt communities. So I was looking at distinct topographical units. And I guess that's where I was visualizing streams. I think Ken was coming from the position, I think his was more of putting things into functional groups. I think that's the way we went as the final sorting of animals into what they were doing. What their employment card was. So, yeah, I think there's a lot of different ways you can express it and I think that was a good one for doing cross-biome comparisons. Yeah, I didn't know how I would handle distinct topographical units...

VR [39:27]: You've had a remarkable career. When you look back at the contributions you've made, what do you find the most memorable? What, if you had to single some things out?

RV: I think a lot of the enjoyment that I've had was really interacting with students. I taught a stream ecology class at the University of Delaware and really thoroughly enjoyed that program and put a lot of masters degree students through the department there. Most of my way is loving streams and on occasion I've bumped into a veterinarian that had taken the course Econ & Entomology and, "I'll never take a stream other than the way you taught it". So I think working with that. And then several students with Reds Lowman and John Hopkins and like ?Ellen Silverbuild? just gives me so much pleasure to see how her career went in toxicology. She worked on the interaction of temperature and ?dealdron untessilated darter? on White Clay Creek. I think the way her career just became spectacular it's a huge pleasure. I take a few other PhD students, like ?Bernie? he's really turned out to be a good scientist. So I think you have to have a lot of pleasure in that other people are working. We had some biologists on the staff that are outstanding people, like ?Dave Funkus?, an outstanding entomologist. He was a student at the University of Delaware. And he worked on the River Continuum Project and spent a year or more in Idaho. So I think studying the progress students make has to be a reward.

River Continuum Concept Interviews, 24-27 February 2005

Vincent Resh (VR), Robin Vannote (RV)

VR [41:54]: Thank you very much. This was a great interview, thank you. Thank you very much Robin, this is a really great interview.